

ARDUINO SOLAR TRACKER

USING SERVOS TO MAXIMIZE POWER IN SPACE

In space, solar energy is a vital resource for satellites, probes, and space stations.

This Arduino-based solar tracker uses photoresistors (LDRs) and micro servos to automatically adjust two solar panels so they face the Sun for maximum power generation.



WHY TRACK THE SUN IN SPACE?



Increases power output by 20–40% compared to fixed panels



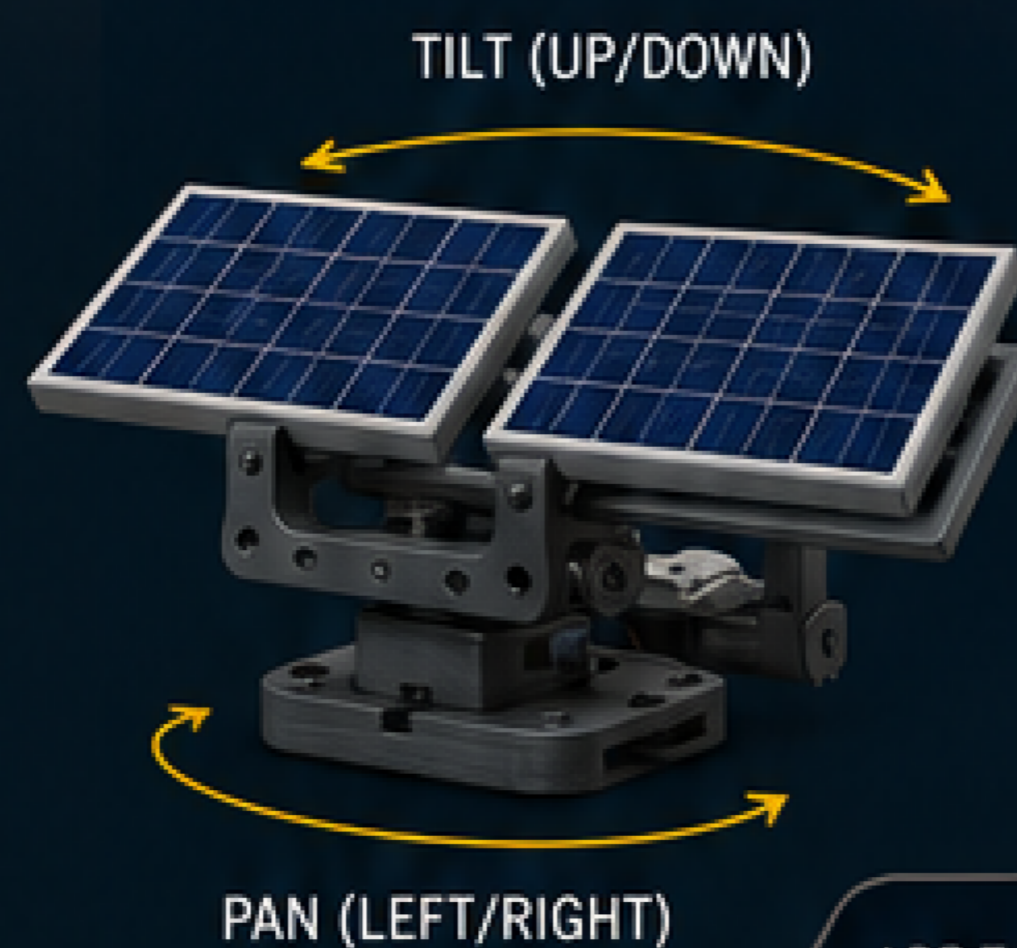
More power means longer missions and higher reliability



Essential for CubeSats, probes, and deep space exploration.

HOW IT WORKS

- 1 Four LDRs placed at the corners of the panel detect light intensity.
- 2 The Arduino compares the light levels from each side.
- 3 The servos adjust the panels (left/right and up/down) to face the brightest direction.
- 4 This process repeats continuously to keep the panels pointed toward the Sun.



SPACE APPLICATIONS



CubeSat Power Systems

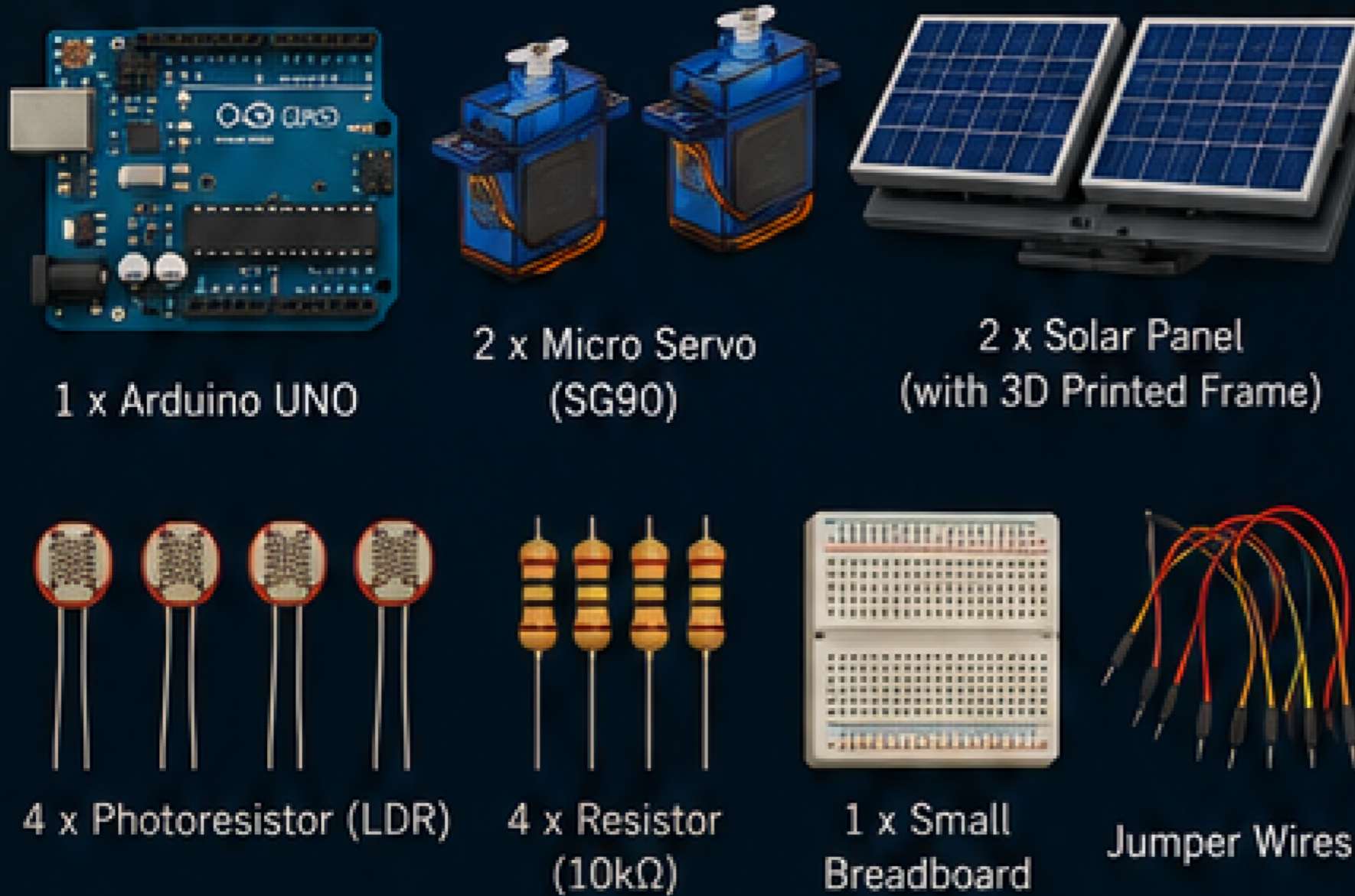


Deep Space Probes



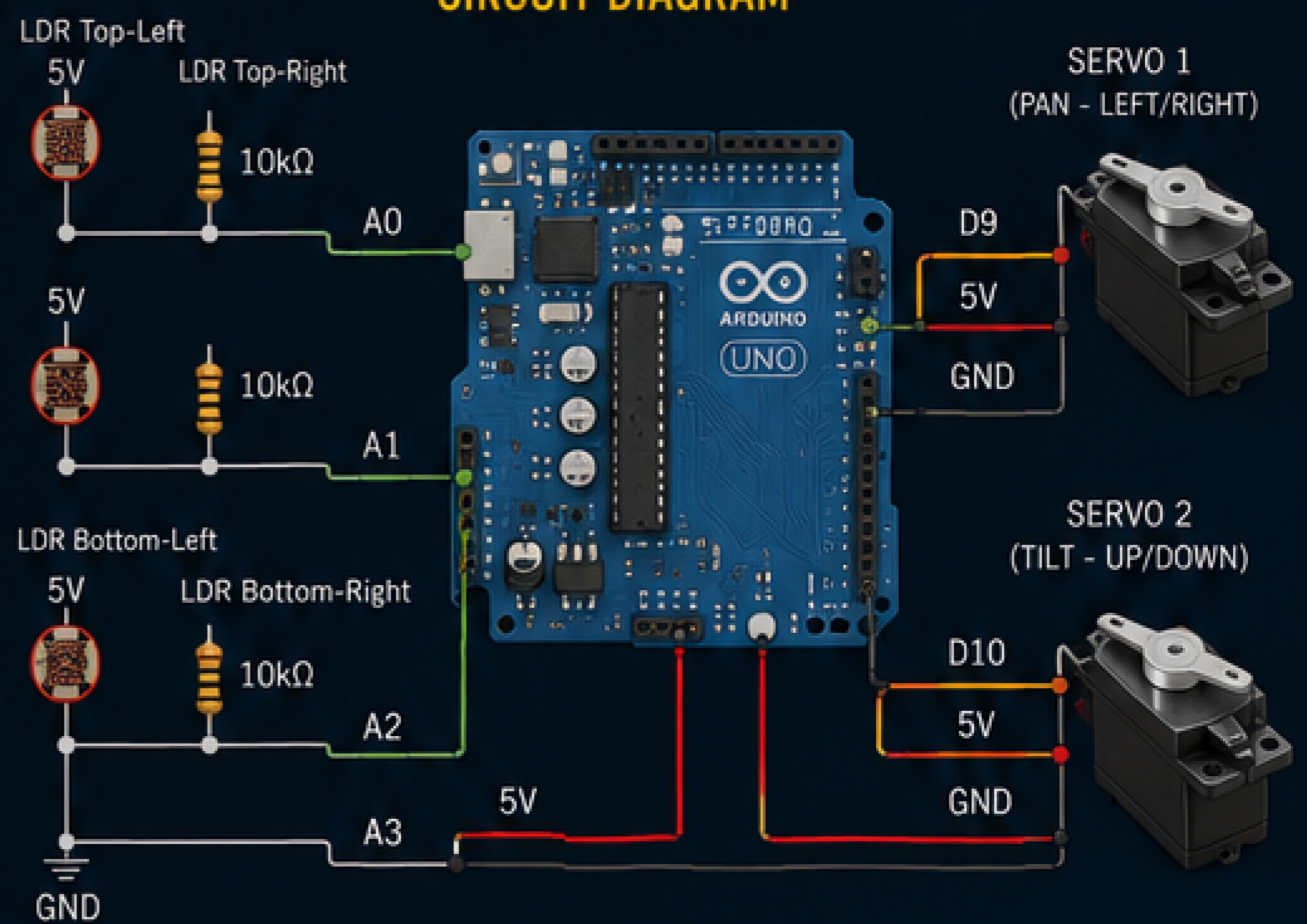
Space Stations & Habitats

COMPONENTS



* All components are lightweight and space-appropriate for educational prototypes.

CIRCUIT DIAGRAM



CODE OVERVIEW (Arduino)

The Arduino reads the four LDR values, calculates the difference between sides, and moves the servos to minimize the difference, keeping the panels aligned with the Sun.

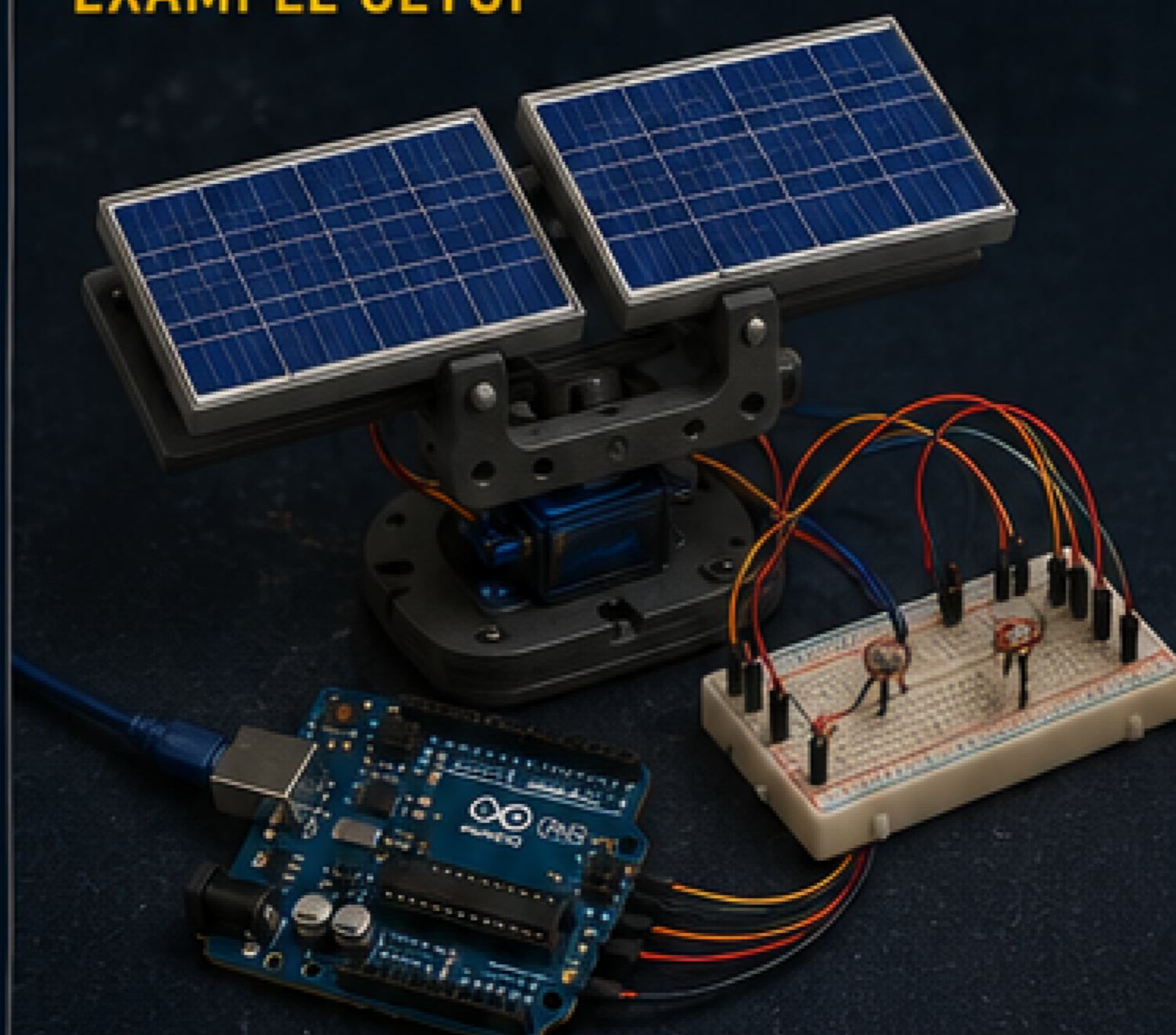
```
int ldrTL = A0;
int ldrTR = A1;
int ldrBL = A2;
int ldrBR = A3;

int servoPan = 9;
int servoTilt = 10;

void setup(){
  // Initialize servos and pins
}

void loop(){
  // Read LDRs
  // Compare left vs right -> pan
  // Compare top vs bottom -> tilt
  // Update servos
}
```

EXAMPLE SETUP



SPECIFICATIONS

Microcontroller	Arduino UNO
Input Sensors	4 x Photoresistors (LDR)
Actuators	2 x Micro Servos (SG90)
Power Supply	5V (via USB or external)
Tracking Axes	2-Axis (Pan & Tilt)
Expected Gain	20–40% more power vs fixed panels
Best Use	CubeSats, small satellites, student projects



Designed for reliability and efficiency in space environments.



TRACK THE SUN. MAXIMIZE POWER. EXTEND THE MISSION.

More power. Longer life. Greater discovery.

